REMARKS

This application has been carefully reviewed in light of the Office Action mailed on March 19, 2003. Claim 87 has been amended. A marked-up version of this claim, showing changes made, is attached hereto as Appendix A. Claims 87-96 remain pending in the application. Reconsideration of the above-referenced application in light of the amendment and following remarks is requested.

In response to comments in the Office Action that there is no claim for a chip carrier, claim 87 has been amended to even better define that it is a method of forming a chip carrier. Claim 87 now recites, "forming a substrate, forming an insulating layer over a first surface of said substrate, providing a support surface for an integrated circuit chip, said substrate, insulating layer and support surface forming part of a chip carrier, supporting an integrated circuit chip with said chip carrier and providing a layer of magnetic field shielding material in contact with said integrated circuit chip." (emphasis added).

Claim 87-88 and 90 are rejected under 35 U.S.C. § 102(b) as being anticipated by Nakagawa. Reconsideration is respectfully requested.

Nakagawa does not teach a "substrate, insulating layer and support surface forming part of a chip carrier, supporting an integrated circuit chip with said chip carrier and providing a layer of magnetic field shielding material in contact with said integrated circuit chip," as recited in claim 87 (emphasis added). The reference is directed toward the manufacture of a printed circuit board (Col. 6, lines 24-25). For at least this reason, withdrawal of the § 102(b) is solicited.

Nakagawa also does not teach "providing a layer of magnetic field shielding material," as recited in claim 87. Nakagawa teaches that "spurious electromagnetic energy . . . flows into the copper ink layer 22 . . . [and] [t]he copper ink layer 22 [is] connected to the ground electrode portion 14a of the electrically conductive layer 14, [and] is grounded in relation to high frequency components." (Col. 5, lines 13-17) (emphasis added). As a

result, "the electromagnetic energy flowing into the copper ink layer 22 . . . eventually flows into high-frequency ground." (Col. 5, lines 18-21). Nakagawa's copper ink layer 22 is not a magnetic field shielding material.

Moreover, Nakagawa's solder layer 26 is not a magnetic field shielding material. Nakagawa teaches that "[t]he solder layer 26 serves to reduce the specific resistance of the copper ink layer 22' (improves the electric conductivity) and to increase the mechanical strength," (Col. 12, line 67 through Col. 13, line 2). Nakagawa does not teach that the solder layer 26 is a magnetic field shielding material as the Office Action asserts.

Accordingly, Nakagawa does not teach "forming a substrate, forming an insulating layer over a first surface of said substrate, providing a support surface for an integrated circuit chip, said substrate, insulating layer and support surface forming part of a chip carrier, supporting an integrated circuit chip with said chip carrier and providing a layer of magnetic field shielding material in contact with said integrated circuit chip," as recited in claim 87 (emphasis added).

Claims 88 and 90 depend from claim 87 and should be similarly allowable along with claim 87 for at least the reasons provided above.

The Office Action further asserts that "Nakagawa clearly shows the magnetic materials (el. 22, 26) on both surfaces of the substrate in Fig. 10 . . . and discloses in Col. 18, lines 9-12 that said shielding materials are formed on both surfaces of the substrate." (Office Action, pg. 5). Applicant respectfully disagrees.

At the outset, Applicant respectfully submit that the copper ink layer 22' and solder layer 26 are not magnetic field shielding material layers as discussed above. Moreover, in Col. 18, the next line, Nakagawa specifically teaches "the results of the experiments conducted by the inventors et al. show that these layers may be formed on only one of the surfaces of the base plate 12," (Col. 18, lines 13-15) (emphasis added).

Nakagawa clearly teaches that through the inventors' experiments, the copper ink layer 22' is only provided on one side of the base plate 12 and not both sides of the base plate 12 as the Office Action asserts.

As a result, Nakagawa does not teach a "layer of magnetic field shielding material [which] is formed on both a bottom surface and a top surface of said chip carrier," as recited in claim 90.

Claim 90 is rejected under 35 U.S.C. § 102(b) as being anticipated by Dlugokecki. Reconsideration is respectfully requested.

Claim 87 recites a method of "forming a substrate, forming an insulating layer over a first surface of said substrate, providing a support surface for an integrated circuit chip, said substrate, insulating layer and support surface forming part of a chip carrier, supporting an integrated circuit chip with said chip carrier and providing a layer of magnetic field shielding material in contact with said integrated circuit chip." Claim 90 depends from claim 87 and incorporates all of the limitations of its base claim.

In particular, Dlugokecki does not teach "a layer of magnetic field shielding material in contact with said integrated circuit chip," as claim 87 recites (emphasis added). Dlugokecki's FIG. 5 clearly illustrates that upper and lower radiation shields 86, 88 are not in contact with the chip 62. Accordingly, withdrawal of this rejection is solicited.

Claim 89 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakagawa in view of Fukuoka. Reconsideration is respectfully requested. As discussed previously, Nakagawa teaches a method of forming a printed circuit board and not a chip carrier which has a magnetically shielded chip. Moreover, Nakagawa does not teach or suggest a magnetic field shielding layer. Claim 89 depends from claim 87 and is allowable for at least the reasons set forth above.

Further, the combination of Nakagawa and Fukuoka is improper. The Office Action asserts that Fukuoka discloses a multiple-layered PCB comprising an embedded magnetic field shielding material layer. For support, the Office Action points to Fig. 1, el. 104. Fukuoka does not disclose any magnetic field shielding materials, much less a magnetic field shielding material layer. Further, elements 104 of Fukuoka are wiring circuits connected to mounting pads 105 and not magnetic field shielding material layers. There is simply no support that wiring circuits 104 are magnetic field shielding material layers.

The Office Action asserts that "Fig. 1 discloses layer 104 which comprises conductive material of tungsten and gold/nickel," and that "[e]ven if Fukuoka does not disclose that said materials will shield electromagnetic interference and his purpose was only to provide electrical circuitry, said material layer will still provide some shielding of electromagnetic interference." (Office Action, pg. 6) (emphasis in original).

However, there is still no teaching or suggestion in Fukuoka that layer 104 functions as a magnetic field shielding layer or comprises a magnetic field shielding material. As a result, there would be no motivation to combine Fukuoka with Nakagawa since Fukuoka does not teach or suggest magnetic field shielding material. Further still, the Office Action has provided no support for the assertion that the material in Fukuoka would even act as a magnetic field shielding layer. Therefore, the rejection of claim 89 should be withdrawn.

Claims 91-96 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakagawa in view of Tracy. Reconsideration is respectfully requested. As discussed previously, Nakagawa teaches a method of forming a printed circuit board and not a chip carrier which has a magnetically shielded chip. Moreover, Nakagawa does not teach or suggest a magnetic field shielding layer. Claims 91-96 depend from claim 87 and are allowable for at least the reasons set forth above.

Further, the combination of Nakagawa and Tracy is improper. There is no motivation to use magnetic field shielding materials comprising ferrites, manganites, chromites, or cobaltites in Nakagawa. The Office Action asserts that Tracy discloses materials which can be deposited "directly on the surface of a cell since it is not electrically conductive." (Office Action, pg. 6) (emphasis added). However, Nakagawa's copper ink layer 22 is electrically conductive.

Nakagawa teaches that "spurious electromagnetic energy . . . flows into the copper ink layer 22 . . . [and] [t]he copper ink layer 22 [is] connected to the ground electrode portion 14a of the electrically conductive layer 14, [and] is grounded in relation to high frequency components." (Col. 5, lines 13-17) (emphasis added). As a result, Nakagawa teaches away from using materials that are not electrically conductive such as the materials that Tracy teaches. Therefore, the rejection of claims 91-96 should be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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APPENDIX A

87. (twice amended) A method of forming a [chip carrier] structure for supporting an integrated circuit chip, [containing structures] which chip may be affected by external magnetic fields, said method comprising:

forming a substrate;

forming an insulating layer over a first surface of [a] said substrate;

providing a support surface for [said] an integrated circuit chip, said substrate, insulating layer and support surface forming part of a chip carrier; [and]

supporting an integrated circuit chip with said chip carrier; and

providing a layer of magnetic field shielding material in contact with said integrated circuit chip which shields said integrated circuit chip from external magnetic fields.